

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/006,568

PATENT APPLICATION
Atty Docket No. Q67594

REMARKS

Claims 1 - 11 are all the claims pending in the application. Claim 8 has been previously withdrawn and claims 9 - 11 are herein cancelled. Accordingly, claims 1 - 7 are presently under consideration.

The amendments made to the claims herein (*supra*) are merely an inclusion of subject matter from dependent claims into certain of the independent claims. Applicant asserts that these claim amendments place the application in condition for allowance, or at the very least in better condition for appeal without raising new issues that would require further consideration or search. The Examiner is therefore respectfully requested to enter this Amendment and subsequently pass the application to allowance.

I. 35 U.S.C. § 102 Rejections

A. Rejection of Claims 1, 5, 9 and 10 under 35 U.S.C. § 102(e) in View of U.S.P. No. 6,270,020 to Thompson

Claims 9 and 10 are herein cancelled, making their rejection moot.

Independent Claim 1

Claim 1 includes the features of supplying a mixture of a pressurized gas and a pressurized liquid to an injection nozzle, supplying and stopping of the pressurized gas to the injection nozzle being controlled based on the supplying and stopping of the pressurized liquid, as detected by a detecting means. Because these features are neither disclosed nor suggested in the Thompson device, this rejection is respectfully traversed.

These issues are discussed in turn, below.

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/006,568

PATENT APPLICATION
Atty Docket No. Q67594

Thompson Fails to Teach or Suggest Supplying a Pressurized Gas to an Injection Nozzle, Let Alone a Mixture of a Pressurized Gas / Pressurized Liquid to an Injection Nozzle

The Examiner compares the Thompson reference to certain features of Applicant's independent claim 1. This comparison is inapposite, as explained below.

The device of Thompson uses gravity to feed a liquid supplied from tank 12 to fill tank 14 through valve V1, strainer 22 and check valve 31. When the tank 14 is full, sensor S3 sends a signal to controller 34 to close valve V1. Sensor S1 is used to depressurize the tank 14 and associated piping (by opening valve V2 to vent) when sensor S4 indicates that the tank 14 is low on fluid and needs to be refilled. Sensor S1 is also used to pressurize the tank 14, by closing valve V2 and opening valve V3, when sensor S3 indicates that the tank 14 is full of fluid.

When the controller is notified by sensor S1 that the tank 14 is somewhere between 100 and 150 psi, in conjunction with a predetermined command (such as a pre-programmed time of day or an external sensor or user input), the controller opens valve V4 and deicing fluid is then expelled from the nozzles 18. Contrary to the Examiner's assertions, however, pressurized gas *never* touches the nozzles 18.

Pressurized gas never touches nozzles 18 because sensor S4 detects when the tank 14 is low on fluid. That is, fluid is never allowed to reach below the level of sensor S4, and therefore, contrary to the Examiner's assertion, pressurized gas is never supplied or stopped to the nozzles 18.

Moreover, because pressurized gas is not supplied to or stopped from being supplied to the nozzles 18, it is impossible for the Thompson reference to teach or suggest a mixture of a pressurized gas and a pressurized liquid to the injection nozzles.

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/006,568

PATENT APPLICATION
Atty Docket No. Q67594

The Thompson reference is deficient, as explained above. Because of these deficiencies, the Examiner is respectfully requested to reconsider and withdraw this rejection.

Thompson Fails to Teach or Suggest Supplying / Stopping of a Pressurized Gas as Recited by Applicant's Claim 1

Claim 1 also includes the feature of supplying and stopping of a pressurized gas to the injection nozzle being controlled based on supplying and stopping of the pressurized liquid, as detected by a detecting means. As noted above, Thompson is deficient because pressurized gas is never allowed to touch the nozzles. Therefore, because the pressurized gas never touches the nozzles, it is impossible for the supplying and stopping of a pressurized liquid to control a pressurized gas touching the injection nozzle. Accordingly, Applicant courteously asks the Examiner to reconsider and withdraw this rejection.

Independent Claim 5

As explained above in relation to claim 1, the Thompson reference is deficient in teaching or suggesting a gas touching an injection nozzle, let alone a mixture of a gas/liquid mixture being sprayed from an injection nozzle. Thompson continues these same deficiencies in relation to independent claim 5.

Thompson Fails to Teach or Suggest a Vacuum Effect

Furthermore, claim 5 also includes the features of a Venturi vacuum effect ("sucking a gas through a jet flow of a pressurized liquid . . ."), wherein a gas and powder/granular material are sucked into a propelled liquid stream to be expelled from the sprayer. The Examiner compares the delivery system of Thompson to Applicant's claim 5. Such a comparison is

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/006,568

PATENT APPLICATION
Atty Docket No. Q67594

inapposite because the system of Thompson is absolutely deficient in teaching or suggesting anything remotely close to a Venturi vacuum system.

Thompson merely uses a pressurized gaseous "head" pressure to thereby pressurize a deicing liquid that is then forced from an outlet (see Figs. 1 – 3 and Cols. 1 – 4). Those of skill in the art recognize the differences between a Venturi vacuum "sucking" effect and pneumatic pressurization of a liquid. Accordingly, the Examiner is respectfully requested to reconsider and withdraw this rejection.

Thompson Fails to Teach or Suggest Supplying and Stopping a Powder/Granular Material Based on the Supplying and Stopping of a Pressurized Liquid

Claim 5 also includes the feature of supplying and stopping delivery of a powder and granular material based on the supplying and stopping of a pressurized liquid. The Thompson reference, in contrast, is deficient in teaching or suggesting any type of powder and granular material being stopped or supplied based upon the supplying and stopping of a pressurized liquid. Thompson merely teaches the spraying of a deicing liquid in one embodiment and the delivery of rock salt in another embodiment. There fails to be any disclosure or suggestion of a combination of Thompson's embodiments in the Thompson reference, and Applicant submits that there is no motivation or suggestion to combine the two embodiments as they are merely alternative methods of deicing a roadway. Additionally, combining the two would result in an inoperative device with many unexplained technical problems left to be resolved.

Based on the previous, Applicant submits that there is no disclosure or suggestion in Thompson of supplying and stopping a powder and granular material based on supplying and

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/006,568

PATENT APPLICATION
Atty Docket No. Q67594

stopping of pressurized liquid. The Examiner is therefore respectfully requested to reconsider and withdraw this rejection for this additional reason.

B. Rejection of Claims 1 – 7 and 11 Under 35 U.S.C. § 102(b) in view of U.S.P. No. 5,312,040 to Woodward

Independent Claim 1

Independent claim 1 is rejected by the Examiner under 35 U.S.C. § 102 in view of the Woodward reference. This rejection is respectfully traversed as follows.

Claim 1 recites that the supplying and stopping of the pressurized gas to the injection nozzle is controlled based on the supplying and stopping of the pressurized liquid. At least these features are absent from the Woodward reference.

While the Examiner compares Woodward's starting and stopping of the delivery of a pressurized gas to Applicant's recital of supplying and stopping of the pressurized gas to the injection nozzle being controlled based on the supplying and stopping of the pressurized liquid, the Examiner misses the following distinction.

The Woodward device shuts off the delivery of pressurized gas when the pressure of the liquid line exceeds 1,000 psi (gas is shut off by closing gate 22 of valve 14). When Woodward's pressurized liquid pressure is less than 1,000 psi, the gate to inlet 20 is shut off (closing off delivery of abrasive material 18), and compressed gas is allowed to flow by opening gate 22 of valve 14 (*see* Col. 7, lines 33 – 46). Woodward therefore starts and stops the delivery of gas based on the *pressure* of the liquid line. In contrast, Applicant's claim 1 starts and stops the delivery of the gas dependent upon the *stopping and starting* of the liquid in the line.

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/006,568

PATENT APPLICATION
Atty Docket No. Q67594

These differences are notable because of the placement of Applicant's gas delivery point. In comparing the structure of Applicant's device to that of Woodward's, Applicant's pressurized gas delivery point 3 is *upstream* of the inlet for the abrasive materials 8 (see Fig. 1). In contrast, Woodward's pressurized gas delivery point 22 is *downstream* of the inlet for abrasive materials 40 (see Woodward's Fig. 1).

Woodward thus relies upon the pressurized liquid stream to create enough of a Venturi vacuum effect (without delivery of pressurized gas) to pull abrasive material all the way from insertion point 40. Apparently, when the liquid pressure is above 1,000 psi there is enough of a vacuum created to pull the abrasive material all the way from the hopper 18 and insertion point 40. However, when the liquid pressure falls below 1,000 psi apparently there is no longer enough of a Venturi vacuum effect to suction abrasive material the entire length of the delivery system, and that is when Woodward requires that the lines be cleared through the application of a pressurized gas because clogs are otherwise likely to occur.

Applicant's device does not have the above-noted problems because of the placement of the pressurized gas delivery point 3 *upstream* of the abrasive material insertion point 8. Applicant's device will not experience clogging as does the Woodward device, and that is why Applicant's independent claim 1 recites the feature of supplying and stopping of the pressurized gas to the injection nozzle being controlled based on the supplying and stopping of the pressurized liquid. By only delivering gas and abrasive material when the liquid is being delivered, Applicant's device is not prone to clogging. Applicant therefore respectfully requests that the Examiner reconsider and withdraw this rejection.

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/006,568

PATENT APPLICATION
Atty Docket No. Q67594

Dependent Claim 2

As to claim 2, the Examiner compares the operation of Woodward's valve 14 to the operation of Applicant's switching valve. This comparison is inapposite because Woodward's valve 14 is controlled by pressure actuator 12, which operates based on the pressure of the liquid 33 in the liquid line 32.¹ In stark contrast, Applicant's claim 2 requires that the operation of the claimed switching valve be based on the *flow* of the liquid ("... wherein the switching valve is controlled to supply and stop the pressurized gas depending on the presence of the flow of the pressurized liquid ..."), and not the *pressure* of the liquid. This claim is also asserted as patentable by virtue of its dependency upon claim 1. Applicant therefore respectfully requests that the Examiner reconsider and withdraw this rejection.

Dependent Claim 3

Claim 3 includes the features of a powder and granular supply means being provided on a flow passage of the pressurized gas. At least these features are absent in the Woodward reference.

By way of explanation, Woodward supplies pressurized gas to valve 14 while abrasive material 18 is supplied well upstream of valve 14 at junction 40. As explained at Col. 7, lines 33 – 46, the gates of valve 14 (gates 20 and 22) operate such that if one is open the other is closed. This is necessary because otherwise the compressed gas would simply reverse-vent through atmospheric opening 52. Stated differently, the powder and granular supply means of

¹ For instance, when Woodward's fluid pressure in the line 32 is above 1,000 psi, the pressurized gas is shut off by closing gate 22 of valve 14. When fluid pressure in line 32 is less than 1,000 psi, the gate to inlet 20 is shut off (closing off delivery of the abrasive material 18) and compressed gas is allowed to flow by opening gate 22 of valve 14. See Col. 7, lines 33 – 46.

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/006,568

PATENT APPLICATION
Atty Docket No. Q67594

Woodward (gravity-hop feeder 16) is not provided on a pressurized gas line, as recited by Applicant's claim 3. In this regard, Applicant's claim 3 provides distinct advantages over the Woodward device, as explained below.

Applicant's pressurized gas source, (shown by element 3 in Fig. 1, and as claimed by claim 3) is located upstream of powder/granular supply means 6. In stark contrast, Woodward's pressurized gas source 61 is located very well downstream of the abrasive material supply means 16 (see Woodward's Fig. 3). Because Woodward's pressurized gas source is downstream of the powder/granular material supply source, clogging of the supply line can occur much more readily and frequently than in Applicant's claimed device. That is, in Woodward's device a blockage is more likely to occur anywhere from juncture 40 to gate 20 (a winding passage with many 90 degree turns and at least one 180 degree turn). Applicant's claimed device does not have this problem because the pressurized gas is located upstream of the powder/granular material supply source. This claim is also asserted as patentable by virtue of its dependency upon claim 1. Applicant therefore respectfully requests that the Examiner reconsider and withdraw this rejection.

Dependent Claim 4

Applicant's claim 4 includes the feature of the supply of the powder/granular material being stopped and *THEN* the supply of the pressurized gas being stopped after a predetermined time passes (following the stop of the flow of the pressurized liquid to the injection nozzle). Such is shown in an exemplary embodiment described in the paragraph bridging pages 15 and 16 of Applicant's specification. In brief, the powder/granular material is stopped but the gas

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/006,568

PATENT APPLICATION
Atty Docket No. Q67594

remains flowing for a predetermined amount of time so as to clear the line of the powder/granular material. These features are absent from the Woodward device.

Indeed, the Woodward device is entirely lacking in any real control over the delivery of the powder as abrasive material supply means 16 is simply a gravity-fed hopper. Moreover, Woodward fails to teach or suggest running the pressurized gas for a predetermined amount of time following the stoppage of the flow of pressurized liquid. This claim is also asserted as patentable by virtue of its dependency upon claim 1. Applicant therefore respectfully requests that the Examiner reconsider and withdraw this rejection.

Independent Claim 5

The Examiner compares the features of claim 5 to the Woodward reference. This rejection is respectfully traversed as follows.

Claim 5 includes the features of spraying a pressurized gas/liquid mixture with a granular material onto an object to be cleaned. Claim 5 also includes the features of supplying and stopping of the delivery of the granular material based on the starting and stopping of the pressurized liquid. These features are absent from the Woodward device.

Woodward does not deliver a mixture of pressurized gas and pressurized liquid inclusive of a granular abrasive material, as does the device of Applicant's claim 5. In brief, Woodward delivers either one or the other of a pressurized gas or a granular material. When Woodward's fluid pressure in the line 32 is above 1,000 psi, the pressurized gas is shut off by closing gate 22 of valve 14. When fluid pressure in line 32 is less than 1,000 psi, the gate to inlet 20 is shut off (closing off delivery of the abrasive material 18) and compressed gas is allowed to flow by opening gate 22 of valve 14. See Col. 7, lines 33 – 46. Therefore, Woodward delivers either one

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/006,568

PATENT APPLICATION
Atty Docket No. Q67594

or the other of a pressurized gas or a granular material, but not both simultaneously as required by Applicant's claim 5.

Claim 5 also includes the feature of the supply and stop of a granular material being controlled based on a supplying and stopping of the pressurized liquid, as detected by a detecting means. Woodward fails to have any control of the delivery of the granular material beyond gravity-delivery (*see* Fig. 1, element 18). Accordingly, Applicant courteously asks the Examiner to reconsider and withdraw this rejection.

Independent Claim 6

Claim 6 includes the features of the supplying and stopping of the pressurized gas being controlled based on the supplying and stopping of the pressurized liquid. These features are absent from the Woodward reference.² In view of the previous, Applicant respectfully requests that the Examiner reconsider and withdraw this rejection.

Dependent Claim 7

Claim 7 includes the features of the powder and granular supply means being provided on a flow passage of the pressurized gas. These features are absent from the Woodward reference.³ Applicant therefore respectfully requests that the Examiner reconsider and withdraw this rejection. This claim is also asserted as patentable by virtue of its dependency upon claim 6.

² Applicant's rebuttal of the Examiner's rejection tracks the reasoning and explanation given previously in relation to the similar features claimed by claim 1.

³ Applicant's rebuttal of the Examiner's rejection tracks the reasoning and explanation given previously in relation to the similar feature claimed by claim 3.

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/006,568

PATENT APPLICATION
Atty Docket No. Q67594

Dependent Claim 11

Claim 11 is herein cancelled, obviating this rejection.

II. 35 U.S.C. § 103 Rejections

A. Rejection of Claims 2 - 4 Under 35 U.S.C. § 103 in view of Thompson

Claims 2 - 4 depend (either ultimately or directly) upon claim 1, and thereby incorporate all of the features of claim 1. As explained in Part I of this Amendment, the Thompson reference is deficient because pressurized gas is never supplied to the injection nozzle, as is required by Applicant's claim 1.⁴ Therefore, because a proper § 103 rejection requires that all of Applicant's claim limitations be taught or suggested, and, in the instant case, because the prior art fails to teach or suggest all of the features of claim 1, the rejection is improper. Applicant therefore respectfully requests that the Examiner reconsider and withdraw this rejection.

Additionally as to claim 3, the Thompson reference is deficient by failing to teach or suggest that a powder and granular supply means is provided on a flow passage of the pressurized gas. Additionally as to claim 4, the Thompson reference is deficient by failing to teach or suggest that the supply of the granular material is stopped and that **THEN** the supply of the pressurized gas is stopped after a predetermined time passes following the stop of the flow of the pressurized liquid to the injection nozzle.⁵

⁴ Pressurized gas never touches nozzles 18 because sensor S4 detects when the tank 14 is low on fluid. That is, fluid is never allowed to reach below the level of sensor S4, and therefore, contrary to the Examiner's assertion, pressurized gas is *never* supplied or stopped to the nozzles 18.

⁵ This rejection is rebutted along the lines of the discussion of claim 4 in view of Woodward above.

AMENDMENT UNDER 37 C.F.R. § 1.116
U.S. Application No. 10/006,568

PATENT APPLICATION
Atty Docket No. Q67594

In view of the previous, the Examiner is respectfully requested to reconsider and withdraw this rejection.

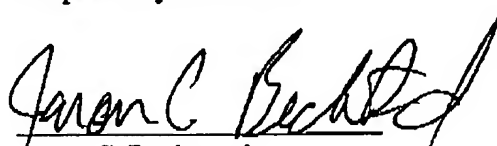
III. Conclusion

As explained above, Applicant's invention includes many features that are absent from the prior art cited by the Examiner. Accordingly, the Examiner is respectfully requested to reconsider and withdraw the noted rejections.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,


Jason C. Beckstead
Registration No. 48,232

SUGHRUE MION, PLLC
Telephone: (650) 625-8100
Facsimile: (650) 625-8110

MOUNTAIN VIEW OFFICE

23493

CUSTOMER NUMBER

Date: August 23, 2004

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this AMENDMENT UNDER 37 C.F.R. § 1.116 is being facsimile transmitted to the U.S. Patent and Trademark Office this 23rd day of August, 2004.


Mariann Tam